Analytic study of the intraoperative surgicalcomplications of elective & emergency cesarean sections: incidence & risk factors.

دراسة تحليلية للمضاعفات الجراحية اثناء العمليات القيصرية الباردة والطارئة: نسبة الحدوث وعوامل الخطورة.

Dr. Basima Shamkhi Al-Ghazali/ MBChB, DGO, FICGO,Consultant & Assistant Professor
Dr. Luma Saad Zeiny, MBChB, DGO, FIBMS. Department of Obstetrics & Gynecology/Medical College /Kufa University.

الخلاصة:
خلفية الدراسة : تمثل الولادة بواسطة العمليات القيصرية نسبة كبيرة من الولادات العامة مع احتمالية أعلى في حدوث المضاعفات و الوفيات عند الام و الطفل.
الاهداف: كان الهدف من الدراسة بيان تأثير عوامل الخطورةعلى نسبة حدوث المضاعفات الجراحية أثناء العمليات الباردة والطارئة.
الطريقة:أجريت الدراسة في الفترة من حزيران إلى كانون الاول ٢٠١١ واشتملت على ٦٠٠ مريضة من اللواتي يراجعن صالة الولادة والعيادة الخارجية في قسم النسائية والتوليد في مستشفى الزهراء التعليمي للولادة والأطفال في النجف الاشرف قسموا الى مجموعتين: تضمنت الاولى (٢٨٠) عملية قيصرية باردة وتضمنت الثانية (٣٢٠) عملية قيصريةطارئة حيث أجريت المقارنة بين العمليات الباردة والعمليات الطارئة من ناحية المضاعفات الجراحية ومقارنة الحالة العامة للطفل بعد العملية.تم تسجيل المعلومات عن العمر ،عدد الولادات السابقة، عدد العمليات القيصرية السابقة، وزن الأم،حركة الطفل، حالة النزف والأمراض المصاحبة للحمل مثل السكر وارتفاع ضغط الدم.كما واجري الفحص على نسبة الدم ونسبة السكر وفحص السونار لتحديد عمر وحجم الطفل ومكان المشيمة.
النتائج:بينت دراستنا من خلال تحليل الإحصائيات التي جمعت خلال العمليات القيصرية إن هناك تأثير واسع وكبير لنوع العملية (باردة اوطارئة) على مجريات سير العملية القيصرية ومضاعفاتها الجراحية الكبيرة والبسيطة بحيث تكون المضاعفات اكثرنسبة مع العمليات الطارئة بفارق معتد به احصائيا كما وجد إن هناك تأثيرواضح ومعتد به احصائيا لعوامل الخطورة (عمر الحامل،عدد الولادات السابقة،وزن الحامل،عدد العمليات السابقة،وضع المشيمة) على المضاعفات الحاصلة أثناء العملية الجراحية.**الوسائل الاحصائية:** تمت مقارنة النتائج باستخدام اختبارالكاي سكوير.
الاستنتاج: ان أجراء العمليات بطريقة مخطط لها مسبقا مع تحديد عوامل الخطورة اثناء فترة الحمل يقلل من نسب المضاعفات المتوقعة في الظروف الطارئة.
التوصيات: نظرا لكون نسب المضاعفات الجراحية الحاصلة اثناء العمليات القيصرية اعلى عند اجرائها في الظروف الطارئة، فانه من الموصى به ان يتم اجرائها في ظروف باردة.

Abstract:
Background: Cesarean section accounts for a substantial proportion of total deliveries & is associated with higher rates of maternal & neonatal morbidity.
Objective: to determine the effect of the risk factors on the incidence of intraoperative surgical complications in elective & emergency cesarean sections.
Methods: This study was conducted in AL-Zahra'a Teaching Hospital of Maternity & Pediatrics in Najaf city, from June to December 2011. A total of 600 patients who had lower-segment cesarean section (280 patients with elective cesareans &320 patients with emergency procedures) participated in the study. A comparison was done between major & minor surgical complications&neonatal outcome in both groups with estimation of the effect of maternal age, body mass index, parity, previous C/S & placenta previa on the incidence of intraoperative surgical complications.
Results: Intra-operative surgical complications& poor neonatal outcomewere more commonly associated with emergency than with elective procedures (P<0.05).Uterocervical laceration& blood loss requiring blood transfusion were the most frequent complications & they were more commonly associated with increased maternal age, parity, body mass index, placenta previa&abruption, previous cesarean & emergency conditions.
Statistical analysis: The data were analyzed using spss version 15 with the chi –squared test to determine the association between the various factors under investigation.
Conclusion: every effort should be directed to affect planned cesarean section with evaluation of risk factors during the antenatal period if possible, so as to reduce the various problems associated with emergency cesarean section.
Recommendations: owing to the higher incidence of intraoperative complications if C/S is undertaken in the emergency situations, it is recommended to be accomplished as an elective procedure.
Keywords: Cesarean section. Intraoperative complications. Risk factors.

INTRODUCTION:

Cesarean section (C/S) is defined as delivery of a viable fetus through an abdominal incision (laparotomy) & uterine incision (hysterotomy). It is the most common surgical procedure in Obstetrics with an incidence ranging from 10% to 25%.[1] It can be traced to 700 BC in Rome, when the procedure was first used to remove infants from women who died late in pregnancy. The first C/S was performed on a living patient in 1610. The maternal mortality rate was high up to the end of the 19th century, most often because of hemorrhage & infection. However, advances in surgical & anesthetic techniques, safe blood transfusions, & the discovery of effective antibiotics have led to a dramatic decline in the mortality rate. [2]

Although cesarean delivery is much safer now than in the past & the fact that it is a life-saving operation in certain circumstances, it is a major surgery & should be done only when the health of the mother or baby is at risk. For the patient who is about to give birth, C/S carries considerable disadvantage when compared with normal vaginal delivery. This is not only in terms of the pain & trauma of an abdominal operation, but also because of the possible associated complications which cannot be totally avoided. [2, 3]

A C/S is performed for a vast array of indications including, placenta previa or abruption, malpresentation such as breech or brow, cephalo-pelvic disproportion, fetal distress, or previous csareans. [4, 5] Most often the nature of C/S, in terms of whether it is performed as an elective surgical procedure or as an emergency, as predicted by its indication, has a great impact on the incidence & the type of the likely complications that may occur intra-operatively or following the procedure. When the need for C/S arises, it is often much better for the patient if adequate time is allowed to prepare for the procedure.[5] Thus, when the C/S is performed electively, the chances of morbidity complicating the operation would be much less than when it is performed as an emergency. However, in spite of all attempts to electively deliver the pregnancy by C/S, many times emergency C/S may have to be resorted to, for fetal or maternal salvage, even if there may be problems associated with it. [6]

Even in best hands,intra-operative complications such as lacerations & bleeding may occur, at rates varying from 6% for elective C/S to 15% for emergency C/S.There are many risk factors that may be implicated in the increased incidence of certain types of intra-operative complications, e.g. having a C/S increases the risk of major bleeding in a subsequent pregnancy because of placenta previa (5.2 per 1000 live births) & placental abruption (11.5 per 1000 live birth).[7] The type of C/S, whether it is emergency or elective, may have an impact on the neonatal outcome.Among term babies, the risk of neonatal respiratory distress necessitating oxygen therapy is higher if delivery is by C/S (35.5 with a prelabourC/S versus 12.2 with a C/S during labour versus 5.3 with vaginal delivery, per 1000 live births).Also, a recent study has reported that the risk of unexplained stillbirth in a second pregnancy is somewhat increased if the first birth was by C/S rather than by vaginal delivery (1.2 per 1000 versus 0.5 per 1000).[5]Furthermore the maternal mortality is higher than that associated with vaginal birth (5.9 for elective C/S versus 18.2 for emergency C/S versus 2.1 for vaginal birth, per 100 000 completed pregnancies in the United Kingdom).Lastly, birth by C/S is not generally considered "natural" or "normal".[5, 8]

It has been recognized that most studies looking at the risk of C/S may have been biased, as women with medical or obstetric problem were more likely to have been selected for an elective C/S. Thus, the occurrence of poor maternal or neonatal

outcomes may have been due to the problem necessitating the C/S rather than to the procedure itself. [7, 8]

In this series we aimed to measure the effect of type of C/S, whether it is elective or emergency, & the effect of risk factors on the incidence of intra-operative minor & major surgical complications.

PATIENTS & METHODS:

This study was carried out on 600 pregnant ladies who had undergone lower segment C/S in AL-Zahra'a Teaching Hospital for Maternity & Pediatrics in Najaf city from June to December 2011. Participantswere selected for the study from patients attending labor ward & outpatient clinics at department of Obstetrics & Gynecology. Antenatal & postoperative events of those patients were recorded &they weredivided into 2 groups according to the type of C/S they had. Group I included280 patients with elective procedures& group II included320 emergencycases. The study protocol was approved by the scientific & ethical committees at department of Obstetrics & Gynecology inKufa Medical College. An informed written consent has been taken from all participants in the study.

Patients excluded from the study if they had additional surgical procedures during C/S (ovarian cystectomy, lysis of adhesions, hernia) or if they had intrauterine fetal death. A detailed history was taken & a thorough examination was performed for all patients & the following parameters were measured & analyzed: age, parity,body mass index (BMI), chronic diseases, obstetrical complications, history of previous C/S & number of C/S, indication of C/S, type of C/S whether emergency or elective, fetal condition before C/S whether in distress or not, APGAR score recorded at 5 min, ultrasound findings as location of placenta & grading of placenta previa, laboratory investigation as hemoglobin level& random blood sugar in addition to blood grouping &saving.

Each C/S is performed by a resident with more than 2 years of surgical training in the field of Obstetrics & Gynecology & is always supervised by an attending senior obstetrician. After assigning an informed written consent covering the possible complications of C/S, all patients were pre-operatively prepared with skin cleansing, intravenous prophylactic antibiotics (second-generation cephalosporins) & administration of indwelling urinary catheter.

Under general anesthesia or spinal anesthesia, the abdomen is entered via a Pfannenstiel incision & subcutaneous incision is done using either a scalpel or blunt dissection. Fascial incision are done transversely using a scalpel & extended laterally by scissors. Rectus muscles are not cut. The peritoneum is opened by a blunt dissection. Bladder flap is developed on all surgeries, unless technically difficult due to intra-abdominal adhesions & in these cases a bladder blade is used to protect the bladder. The uterus is opened with a transverse incision in the lower uterine segment & expanded bluntly. All the fetuses were delivered manually without the use of instrumental delivery. Following delivery, all women received prophylactic intravenous 10 IU oxytocin 0.8 mg ergometrine (if not contraindicated). The placenta is removed by controlled cord traction, placental remnants are cleaned with a surgical cloth & most surgeons inspect the lower segment to confirm cervical dilatation. The uterus is exteriorized &its incision is closed with a double layer using vicryl.

Peritoneumis not closed routinely. Fascial closure is done byrunning non-lockedsutures with nylon. Subcutaneous fat tissue isapproximated bythree single sutures. Skin is closed subcuticularly by nylon sutures.

Intraoperative minor & major complications of surgerywere recorded. The major surgical complicationsreviewed werehysterectomy, broad ligament hematoma, pelvic organ injury (ovaries, fallopian tubes, urinary bladder, ureters& bowel), vascular injury, especially uterine arteries, the need ofinternal iliac artery ligation& blood loss requiring blood transfusion. The minor surgical complications reviewed were uterine lacerations, abdominal muscles injury, & small hematoma.Comparison of these data obtained from elective & emergency C/Swas done with evaluation of risk factors that may affect the incidence of intra-operative surgical complications.Neonatal outcomes in the form ofAPGAR score recorded at 5 minutes, injury to the baby, the need of oxygen therapy, endotracheal intubation & admission to the nursery care unit were evaluated.

Statistical analysis: The data were analyzed using spss version 15 with the chi–squared testto determine the association between the various factors under investigation. A probability value of ≤0.05 was considered as statistically significant.

RESULTS:

During the period of this study 600 patients were taken, 280 patients with elective C/S comprising group I&320 patients with emergency C/S comprising group II with the following indications: recurrent C/S, fetal distress, breech, prolonged &/obstructed labour, preeclampsia/eclampsia, diabetes mellitus, cephalo-pelvic disproportion, placenta previa, abruptio placentae or postdate.

Table1: Indications for elective (group I) & emergency C/S (group II).

Indication	Group I (n=280)	Group II (n=320)	Total (n=600)	P-value
Recurrent C/S	**140 (50%)**	**57 (17.8%)**	**197(32.8%)**	**<0.05**
Fetal distress	**40 (14.3%)**	**24 (7.5%)**	**64(10.6%)**	**<0.05**
Breech	**16 (5.7%)**	**14 (4.3%)**	**30 (5%)**	**NS**
Prolonged/obstructed labour	**0**	**115(35.9%)**	**115(19.1%)**	**<0.05**
Preeclampsia/eclampsia	**17 (6.1%)**	**34 (10.6%)**	**51(8.5%)**	**<0.05**
Diabetes mellitus	**4 (1.4%)**	**2 (0.6%)**	**6(1%)**	**NS**
Cephalo-pelvic disproportion	**20 (7.1%)**	**35 (10.9%)**	**55(9.1%)**	**<0.05**
Antepartum hemmorhage	**13 (4.6%)**	**16 (5%)**	**29(4.8%)**	**NS**
Postdate	**30 (10.7%)**	**23 (7.2%)**	**53(8.8%)**	**<0.05**

*Data are expressed as number (percentage). ******NS= non-significant.

Table (1) revealed the indications of elective & emergency cesarean sections. In elective C/S the major indication was recurrent C/S (50%) as compared to (17.8%) in emergency C/S with a statistically significant difference while the major indication in emergency cases was prolonged &/or obstructed labour(35.9%) with a statistically significant difference ($p<0.05$). The incidence of fetal distress & postdate pregnancy were significantly higher in elective than with emergency procedures ($p<0.05$) while the incidence of prolonged &/or obstructed labour, preeclampsia &cephalo-pelvic disproportion were significantly higher in emergency conditions ($p<0.05$). The incidences of breech presentation, diabetes, & placenta previa show no statistically significant differences.

The overall incidence of intraoperative surgical complications was 27.6% (19.6% versus 8% for minor & major complications respectively) as shown in (table 2 & table 3).

Table 2: Incidence of intraoperative minor surgical complications.

Intraoperative minor surgical complications	Group I** (n=280)	Group II** (n=320)	Total (n=600)
Uterocervical lacerations	15(5.4%)	35(11%)	50(8.3%)
Abdominal muscle injury	0(0.0%)	3(0.9%)	3(0.5%)
Small hematoma	23(8.2%)	42(13.1%)	65(10.8%)
Total	38(13.6%)	80(25%)	118(19.6%)

*Data are expressed as number (percentage). ** P-value<0.05.

Table (2) showed that all the minor complications (uterocervical laceration, small hematoma & abdominal muscle injury) were significantly higher in emergency than with elective C/S ($p<0.05$).

Table 3: Incidence of intraoperative major surgical complications.

Intraoperative major surgical complications	Group I** (n=280)	Group II** (n=320)	Total (n=600)
Hysterectomy	1(0.4%)	6(1.9%)	7(0.7%)
Broad ligament hematoma	0(0.0%)	2(0.6%)	2(0.3%)
Bladder injury	0(0.0%)	3(0.9%)	3(0.5%)
Uterine arteryinjury	3(1%)	12 (3.7%)	15(2.5%)
Internal iliac artery ligation	1(0.4%)	3(0.9%)	4(0.7%)
Blood transfusion	4 (1.33%)	13 (4%)	17 (2.8%)
Total	9(3.2%)	39(12.2%)	48(8%)

*Data are expressed as number (percentage). **P-value<0.05.

Table (3) showed that all the major complications (hysterectomy, broad ligament hematoma, bladder injury, uterine artery injury, internal iliac artery ligation) were significantly higher in emergency than with elective C/S ($p<0.05$). The incidence of small hematoma formation (10.8%) is the highest followed by uterocervical lacerations (8.3%) & uterine artery injury (2.5%) as shown in (table 2 & table 3) & lowest for bladder injury (0.5%). There were no cases of bowel, vagina, fallopian tubes, ovarian or ureteric injury during the study.

Evaluation of the effect of risk factors on the incidence of intraoperative complications revealed that advanced maternal age, obesity, multiparity, were significant risk factors of complications especially uterocervical lacerations & increased blood loos requiring transfusion ($p<0.05$) as shown in(tables 4).

Table 4: The effect of age, parity & BMI on incidence of intraoperative complications.

Risk factor	Age/ year			Parity/number			BMI/ kg.m^2			
	<18 (n=25)	18-35 (n=365)	>35 (n=210)	Nulipara (n=159)	<5 (n=357)	>5 (n=84)	<19 (n=95)	19-24.9 (n=355)	25-29.9 (n=120)	>30 (n=30)
Laceration	9 (1.5%)	14 (2.3%)	27 (4.5%)	7 (1.2%)	13 (2.2%)	30 (5%)	2 (0.3%)	6 (1%)	14 (2.3%)	28 (4.6 %)
Abdominal muscle injury	1 (0.2%)	1 (0.2%)	1 (0.2%)	1 (0.2%)	1 (0.2%)	1 (0.2%)	1 (0.2%)	0 (0.0%)	1 (0.2%)	1 (0.2 %)
Uterine artery injury	4 (0.7%)	7 (1.2%)	4 (0.7%)	5 (0.8%)	6 (1%)	4 (0.7%)	1 (0.1%)	5 (0.8%)	6 (1%)	3 (0.5 %)
Hematoma	2 (0.3%)	18 (3%)	47 (8.7%)	35 (5.8%)	18 (3%)	14 (2.3%)	1 (0.2%)	17 (2.8%)	23 (3.8%)	26 (4.3 %)
Bladder injury	0 (0.0%)	2 (0.3%)	1 (0.2%)	0 (0.0%)	3 (0.5%)	0 (0.0%)	0 (0.0%)	1 (0.2%)	2 (0.3%)	0 (0.0 %)
Hysterectomy	0 (0.0%)	2 (0.3%)	5 (0.8%)	0 (0.0%)	6 (1%)	1 (0.2%)	0 (0.0%)	6 (1%)	1 (0.2%)	0 (0.0 %)
Internal iliac ligation	1 (02%)	2 (0.3%)	1 (0.2%)	1 (0.2%)	2 (0.3%)	1 (0.2%)	0 (0.0%)	1 (0.2%)	2 (0.3%)	1 (0.2 %)
Blood transfusion	1 (0.2%)	4 (0.7%)	12 (2%)	2 (0.3%)	11 (1.8%)	4 (0.7%)	0 (0.0%)	7 (1.2%)	8 (1.3%)	2 (0.3 %)
p-value	<0.05			<0.05			<0.05			

**Data are expressed as number (percentage).*

Table 5: The effect of placenta previa, abruption & previous cesareans on the incidence of intraoperative complications.

Risk factor		Laceration	Abdominal muscle injury	Uterine artery injury	Hematoma	Bladder injury	Hysterectomy	Internal iliac artery ligation	Blood transfusion	p-value
Grade of placenta previa	I (n=7)	3 (0.5%)	0 (0.0%)	2 (0.3%)	3 (0.5%)	1 (0.2%)	0 (0.0%)	0 (0.0%)	0 0.0%)	<0.05
	II (n=12)	0 (0.0%)	1 (0.2%)	6 (1%)	2 (0.3%)	0 (0.0%)	2 (0.3%)	1 (0.2%)	2 (0.3%)	
	III (n=6)	1 (0.2%)	0 (0.0%)	2 (0.3%)	0 (0.0%)	0 (0.0%)	4 (0.7%)	4 (0.7%)	5 (0.8%)	
Abruptio placentae (n=4)		0 (0.0%)	0 (0.0%)	2 (0.3%)	4 (0.7%)	0 (0.0%)	2 (0.3%)	0 (0.0%)	4 (0.7%)	<0.05
Number of previous C/S	I (n=51)	20 (3.3%)	0 (0.0%)	8 (1.3%)	4 (0.7%)	0 (0.0%)	0 (0.0%)	26 (4.3%)	1 (0.2%)	<0.05
	II (n=114)	23 (3.8%)	1 (0.2%)	13 (2.2%)	12 (0.2%)	1 (0.2%)	1 (0.2%)	3 (0.5%)	2 (0.3%)	
	>II (n=42)	31 (5.2%)	2 (0.3%)	26 (4.3%)	16 (2.7%)	2 (0.3%)	2 (0.3%)	0 (0.0%)	6 (1%)	

*Data are expressed as number (percentage**).**

Table (5) revealed that multiple repeat C/S, placenta previa& abruption were significant risk factors of complications especially uterocervical lacerations & increased blood loos requiring transfusion ($p<0.05$) .

Table 6: Neonatal outcome in elective (group I) & emergency C/S (group II).

Neonatal outcome	Group I (n=280)	Group II (n=320)	Total (n=600)	P-value
Apgar score < 7	12(4.3%)	29(9.1%)	41(6.8%)	<0.05
Need O2	28(9.4%)	91(28.4%)	119(19.8%)	<0.05
Need Admission	12(4.3%)	29(9.1%)	41(6.8%)	<0.05
Total	52(18.6%)	149(46.6%)	201(33.5%)	<0.05

*Data are expressed as number (percentage).

Table (6) revealed that the incidences of poor neonatal outcomes (APGAR score < 7 & respiratory distress necessitating oxygen &/or admission) were significantly higher in emergency than elective cases ($p<0.05$). There was no any injury to the babies during cesareans, nor any newborn needed endotracheal intubation.

DISCUSSION:

It is generally accepted that a planned operation often does better in terms of morbidity than one performed as an emergency. Yet, in spite of all attempts to electively deliver the patients by C/S when this is indicated, many times this has to be carried out as an emergency for reasons beyond the control of the attendant. It is therefore essential, to compare the outcomes of the deliveries in both situations.

Our data revealed that the most common indication of elective C/S is previous C/S while the most common indication in emergency cases was prolonged labour. These findings were similar to Aisien et al [(9)]study. The incidence of maternal diseases (e.g. preeclampsia)& pregnancy-complications (e.g. cephalo-pelvic disproportion)in our study is significantly higher in emergency than elective cases, whileprevious studies found that elective cases had a greater risk in terms of maternal diseases, pregnancy complications & previous cesarean sections.These differences may be attributed to inadequate antenatal care which is common in our patients.Therefore, every effort should be made in the antenatal clinic to pick up the cases that are likely to result in difficult labor, such as large babies, small pelvis, malposition & others that may indicate the need for C/S in order to reduce the incidence of failed labor that will end up in emergency C/S. The overall incidence of intraoperative surgical complications in our series was 27.6% (19.6% versus 8% for minor & major complications respectively) & was significantly higher in emergency than elective procedures. Although Hager et al [(10)] found that cesarean delivery was associated with a high complication rate (21.4%);these figures were higher than those quoted from previous studies.

In a prospective study done by Nielsen &Hokegard [(11)], the overall incidence of intraoperative surgical complication rate was 11.6%, with a significant difference noted between elective & emergency procedures (4.2 & 18.9%, respectively). In another retrospective chart review conducted by Bergholt [(12)]& colleagues, the chance of overall surgical complications was 12.1%,&was significantly higher in the emergency CS group (14.5%) as compared with the elective CS group (6.8%). Van Ham et alfound that the overall maternal intra-operative complication rate was 14.8%& the emergency caesarean sections carried the greatest risks regarding maternal complications as compared to elective procedures.Chhabra et al [(13)] found that the incidence of intraoperative complications after postlabour emergency C/S was 8.25%.It is common for emergency operations to be undertaken when the patient has been in labor, membranes ruptured over a period of time & several vaginal examination have been performed, thereby introducing a potent source of infection. On the other hand increased stretching of the lower segment& the impaction of the presenting part into the pelvic cavity, which are commonly associated with emergency procedures,may explain these findings.

Hysterectomy& bladder injury were uncommon in our study at 0.7%& 0.5% respectively& were more commonly found in emergency than elective procedures.However Bergholt's[(12)] study found that the incidence of hysterectomy & bladder injury were 0.2%& 0.5% respectively& did not differ significantly between emergency & elective procedures.Villar et al[(14)] reported the results of a multicenter WHO prospective studyin 120 Latin American health facilities. Hysterectomy was significantly more common among women who experienced bothelective, (odds ratio [OR]: 4.57; 95% CI: 2.84–7.37) & emergency cesareanbirth (adjusted OR: 4.73; 95% CI: 2.79–8.02) than vaginal birth. The incidence of bladder laceration in our series was within the ranges found by Phipps [(15)]& Cahill [(16)] studies.

The incidence ofuterocervical laceration in our series was 8.3%, being significantly more common during emergency than elective surgical birth. This incidence is somewhat higher than that of Bergholt's[12] who found that the incidence of vaginal laceration was 1.2% & cervical laceration was 3.6% but lower than that of a previous study where the most common complications were lacerations of the uterine corpus (10.1%).

We found that the incidence of blood loss requiring blood transfusion was 2.8% & were more commonly associated with emergency than elective procedures while Bergholt's[12] found that 1% of women requiring a blood transfusion. These rates were similar for both elective & emergency births. In the large WHO study in Latin America, blood transfusion was reported in less than 1% of women. However, it was significantly more common following both elective (adjusted OR: 1.75; 95% CI: 1.33–2.30) & emergency cesarean (adjusted OR: 1.39; 95% CI: 1.10–1.76) when compared with vaginal birth. [14]

Regarding the relationship between maternal age & the incidence of intraoperative complications, advanced maternal age has been shown to be a significant risk factor for intraoperative complications especially uterocervical laceration. These findings were similar to Bergholt et al [12] & Zwart et al. [17]

Multiparity has been shown to be associated with higher incidence of intraoperative complications in our series. These results were in contrary to those of Zwart's [17] who found that nulliparity was significant risk factor for complications. In our study significant effect of high BMI on the incidence of intraoperative complications was revealed & these findings were in accordance with the studies of Bergholt et al [12] & Zwart et al.[17]

Furthemore, it has been shown in our analysis that grade three placenta previa have more surgical complications which is mostly severe bleeding & increased incidence of hysterectomy than placenta previa grade one, mainly due to placenta acreta, where lower segment of uterus was deeply invaded by trophoblastic tissue & bleeding did not stop during C/S even after ligation of internal iliac arteries. These results were consistent with Bergholt et al,[12]Akinola et al [18]&Boutsikou T. [19]

Finally, asignificant effect of repeated C/S on the incidence of intraoperative complications was evident in our study.It has been revealed that the incidence of complications especially uterocervical laceration, uterine artery injury& bladder injury in women having three or more prior cesareans was significantly higher as compared with women with one prior C/S. These mainly result from excessive adhesions in lower segment, thinning of lower segment & difficulty to dislodge bladder away from site of incision. These findings were similar to those of Sobande et al [20] & Silver et al [21] studies.

Our data revealed that the neonatal outcome was less favorable in emergency operations, with more cases with APGAR score of <7 (9.1%), than in patients with elective C/S (4.3%) where the difference was statistically significant ($p<0.05$). These findings were in contrary to the findings of previous studies.[11, 19, 20, 21] This is difficult to explain since emergency cesareans are often carried out to salvage the fetus in most cases. It might be a good idea, therefore, to look into this aspect again, with a view of determining the effect of elective & emergency C/Son neonatal outcome.

CONCLUSIONS:

Emergency C/S poses a greater risk of intraoperative morbidity than elective one with a significant impact of advanced maternal age, obesity, multiparity, multiple repeat cesareans & placenta previa& abruption on the incidence of minor & major complications during C/S.

RECOMMENDATIONS:

Firstly, C/S is an integral part of modern Obstetrics & all obstetricians should be skilled in the performance of this surgical technique & be acknowledgeable in the management of intraoperative complications, which constitute a major contributor in the maternal & perinatal morbidity & mortality statistics. Secondly, the proportion of emergency operations needs to be reduced, either in favor of elective procedures, or by allowing more patients to give birth by the vaginal route. Lastly, risk factors must be carefully assessed during the antenatal management of each pregnancy & preventive measures should be in place prior to embarking upon surgical birth.

REFERENCES:

1. Menacker F. Trends in cesarean rates for first births & repeat cesarean rates for low-risk women: United States, 1990-2003.*Natl Vital Stat Rep*. Sep 22 2005; 54 (4):1-8.
1- Reiss H. Abdominal delivery in the 16th century.*J R Soc Med*. Jul 2003; 96 (7):370.
2- Todman D. A history of caesarean section: from ancient world to the modern era.*Aust N Z J ObstetGynaecol*. Oct 2007; 47 (5) :357-61.
3- Cho MK, Kim TH, Song TB. Predictive factors for vaginal birth after cesarean delivery.*Int J Obstet Gynecol*. 2004 Sep; 86(3):392-3.
4- Grivell MR, Dodd JM.Short- & Long-term Outcomes after Cesarean Section.*Expert Rev of Obstet Gynecol*. 2011;6(2):205-215.
5- Smith GC, Pell JP, Dobbie R. Caesarean section & risk of unexplained stillbirth in subsequent pregnancy. *Lancet*.2003; 362(9398):1179-84.
6- Hannah ME. Planned elective cesarean section: A reasonable choice for some women? *CMJ*.2004; 170: 813-814.
7- Tanrýverdi HA, Aktunç E, DölenÝ.Intraoperative Surgical Complications in Cesarean Sections.*J Turkish German Gynecol Assoc*. 2003; 4(1): 27-32.
8- Aisien AO, Lawson JO, Adebayo AA. A five year appraisal of caesarean section in a northern Nigeria university teaching hospital.*Niger Postgrad Med J*. 2002 Sep; 9 (3):146-50.
9- Hager RM, Daltveit AK, Hoffoss D, Nilsen ST, Kolaas T, Qian P, Henriksen T. Complications of cesarean deliveries: rates & risk factors. *Am J Obstet Gynecol*. 2004; 190(2):428-34.
10- Declerq ER ,Sakala C, Corry MP. Listening to Mothers: Report of the First National U.S .Survey of Women's Childbearing Experiences. New York: Maternity Center Association, Oct 2002.
11- Bergholt T, Stenderup JK, Vedsted–Jacobsen A, Helm P, Lenstrup C. Intraoperative surgical complications during cesarean section: an observational study of the incidence & risk factors. *ActaObstetGynecol Scand*. 2003; 82(3):251-256.

12- Chhabra S. Maternal morbidity with caesarean section for non-progress of labour: an analytical study. *J Indian Med Assoc*. 2007 Dec; 105 (12):684-6.
13- Villar J, Carroli G, Zavaleta N et al. Maternal & neonatal individual risks & benefits associated with caesarean delivery: multicentre prospective study.2007; *BMJ*.335(7628), 1025.
14- Phipps MG, Watabe B, ClemonsJL, Weitzen S, Myers DL. Risk factors for bladder injury during cesarean delivery.*Obstet Gynecol.* 2005; 105(1):156-60.
15- Cahill AG, Stout MJ, StamilioDM, Odebo AO, Peipert JF, Macones GA. Risk factors for bladder injury after hysterotomy. *Obstet Gynecol*. 2008; 112(1):116-9
16- Zwart JJ, Richters JM, Ory F, de Vries JI, Bloemenkamp KW, van Roosmalen J. Severe maternal morbidity during pregnancy, delivery &puerperium in The Netherlands. 2008; *BJOG*. 115(7), 842–850.
17- Akinola OI, Fabamwo AO, Tayo AO, Rabiu KA, Oshodi YA, Onyekwere CA. Evaluation of blood reservation & use for caesarean sections in a tertiary maternity unit in south western Nigeria. *BMC Pregnancy & Childbirth.*2010, 10:57
18- Boutsikou T, Malamitsi-Puchner A. Caesarean section: impact on mother & child. *ActaPaediatr*. 2011 Dec; 100(12):1518-22.
19- Sobande A, Eskandar M. Multiple repeat caesarean sections: complications & outcomes.2006; J. *Obstet. Gynaecol*. *Can*. 28(3), 193–197.
20- Silver RM, Landon MB, Rouse DJ et al. Maternal morbidity associated withmultiple repeat cesarean deliveries.2006; *Obstet. Gynecol*. 107(6), 1226–1232.